DOCUMENT RESUME

ED 097 419 CE 002 116

TITLE	Technical Report No. 1: Appendix M. Final Report.
INSTITUTION	Massachusetts Univ., Amherst. Center for Occupational Education.
SPONS AGENCY	Massachusetts State Dept. of Education, Boston. Research Coordinating Unit for Occupational Education.; New York State Education Dept., Albany. New York Research Coordinating Unit.
PUB DATE	Jun 72
NOTE	72p.; For related documents see ED 060 218, ED 085 541, CE 002 111-117
EDRS PRICE	MF-$0.75 HC-$3.15 PLUS POSTAGE
DESCRIPTORS	*Behavioral Objectives; *Data Collection; *Evaluation Methods; *Information Systems; *Program Evaluation; Recordkeeping; Records (Forms); School Role; Vocational Education
IDENTIFIERS	ESCOE; Massachusetts; New York

ABSTRACT

This is one of the outcomes of the work of the Massachusetts Evaluation Service Center for Occupational Education (ESCOE). The report contains information considered absolutely necessary for correct reporting of behavioral objectives to local education agencies and to ESCOE to provide a continuous flow of feedback information. The procedures are illustrated, beginning with the Behavioral Objectives Reporting Form 9 and continuing chronologically with a description of the procedures used in filling out this form correctly. The fields on the form are discussed one by one, with illustrations of appropriate entries. The final section consists of a three-page bibliography. (Author/BP)

ED 097419

Final Report

Evaluation Service Center for Occupational Education

APPENDIX M:

TECHNICAL REPORT NO. 1

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Evaluation Service Center for Occupational Education
Center for Occupational Education, School of Education
University of Massachusetts, Amherst, Massachusetts

June 1972

TECHNICAL REPORT

Number 1

March 1971

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PREFACE

The Evaluation Service Center for Occupational Education (ESCOE) is a developmental project of Massachusetts and New York which seeks to provide a major test for a unique program evaluation model. Specifically, the Evaluation Service Center is designed to provide a technical support system such that each local educational agency (LEA) offering occupational education can receive a continuous flow of feedback information describing student progress on locally determined program objectives. The feedback of descriptive information will be tailored to the program objectives of each individual school and at the same time provide comparative information with other schools offering the same objectives. Obviously, the identity of schools will be held confidential.

The fundamental purpose of the information feedback process supported by the Evaluation Service Center is to provide a meaningful information base to the teacher and the administrator for improvement of instruction in Occupational Education. As a way of exploring the implications of this statement, consider the following definition of educational evaluation: Educational evaluation is a process which seeks to describe the relationship between the outcomes of an educational program and the program itself, such that a prediction of future outcomes from similar programs can occur.

Given the continuous feedback of student performance information on locally determined objectives, it is an easy next step to examine the components of an educational program including the type of students it serves, such that a school might predict future achievement for similar

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students in similar programs. The Evaluation Service Center will provide the basic information, which together with other information (program and student descriptions) provides a basis for prediction, the basic purpose of evaluation. In some cases several educational programs may seek the same objectives, but display a significantly different pattern of student achievement on locally determined objectives. In these instances it becomes educationally useful to search for causal factors. The continuous feedback of information from the Evaluation Service Center provides a systematic base for analyzing the effectiveness of different instructional strategies, both within and between schools. For example, a school might purposefully initiate two competing programs designed to meet common objectives, and receive achievement information geared to these objectives such that an effectiveness comparison might be made. Generally stated, the Evaluation Service Center is designed to provide an objective basis for change and improvement in occupational education.

The Evaluation Service Center is unique from most evaluation programs. Typically, testing programs hold standards constant over schools, i.e. the test represents a standard against which all schools are measured. The Evaluation Service Center, however, holds that such a process is excessively rigidifying, and not likely to provide a supportive information base for the improvement of education. The Evaluation Service Center seeks to provide a continuous feedback of achievement information in occupational education such that multi-standards can be maintained by LEA's. The task is considerably more difficult than the standardized test approach to program evaluation, but certainly more supportive of sound educational practice.

Obviously, the first step of the evaluation process supported by

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the Evaluation Service Center is to assist LEA's in stating their own objectives in such a way that they are measurable. It is the purpose of this publication to describe a uniform process of describing multi-standards entertained by participating schools in such a way that comparison and analysis of locally determined program objectives can occur. From these objectives a variety of tests will be developed so that during the following year the LEA's can receive feedback describing student progress on locally determined objectives, with comparison information to other schools offering similar objectives.

It should be pointed out that the twenty (20) schools participating in the pilot project can not only look forward to the feedback of achievement information in the Spring of 1972, but also can anticipate the feedback of useful information in the Spring of 1971, i.e. an information process such that program standards can be analyzed and compared. For example, it will be possible for a school to compare specific objectives within a unit of a particular occupational program with all other schools by level, by type of school, or by type of objective. A teacher might discover all the specific facts (knowledge) required by all 12th grade auto mechanic programs within the ignition unit. Another example would be the ability to obtain specific physics knowledge objectives across all programs within a school or group of schools. Further, it will be possible to analyze the sequence of unit objectives for all schools within the system. A computer retrieval system will be developed by June of 1971, so that participating schools can analyze curricula either by visiting the Evaluation Service Center or by writing a request to the ESCOE staff. (A user's guide for analysis of program objectives will be made available to the schools by June of 1971.)

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The Evaluation Service Center not only provides an information base for program modification which does not in any way standardize programs in occupational education, but it also provides a reasonable basis for educational accountability. There is no question that with increased levels of local, state and federal support being allocated to occupational education, increased pressure for accountability is being exerted from federal and state levels. It is hoped that the Evaluation Service Center will provide an exemplary model for obtaining and maintaining accountability information that in no way threatens the decision making authority of the professional educator on the local level, but at the same time offers a continuous flow of program evaluation information.

The summation of program evaluation information over schools within a state as provided by the Evaluation Service Center offers a very real statement of payoff in occupational education within a state, but not at the cost of program standardization. From an accountability perspective, the program evaluation process supported by the Evaluation Service Center holds that schools are accountable for outcomes on program objectives that their professional faculties determine relevant. Obviously, these objectives are determined within a framework of the existing social-political structure, i.e. local school boards, advisory committees, industrial and manpower information, state regulations, etc.

If the Evaluation Service Center, or more specifically the twenty (20) pilot schools from Massachusetts and New York, can demonstrate the feasibility of the process of program evaluation that seeks to treat the simultaneous existence of multi-standards across schools, a very important example will be set that can be generalized to all schools offering occupational education. In a very real sense, the faculties of the participating

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schools and the staff of the Evaluation Service Center have an opportunity to offer evidence to the educational community-at-large that education can be managed from an information base in such a way that multi-standards can not only be maintained within local educational agencies, but encouraged.

INTRODUCTION

The Evaluation Service Center for Occupational Education (ESCOE) is committed to and constantly aware of its long range goals and of its potential impact in all areas of Occupational Education. It feels that significant progress in the achievement of these goals depends upon the concentration of its resources on the development of an operational prototype as a model for further systems expansion.

As envisioned and carefully planned by the Evaluation Service Center, this prototype will consist of a detailed coverage, by way of Behavioral Objectives, of four selected Sub Groups (as classified by the United States Office of Education Codes) in the field of Occupational Education. After much consideration, it has been decided by the Center that the most effective utilization of its present resources, as it proceeds towards test development, would be achieved by concentrating upon selected occupational areas. These areas are those which appear most frequently across participating schools.

The four Sub Group areas that have been selected for this purpose are:

(1)	AUTOMOTIVE MECHANICS	17.03020000
(2)	INDUSTRIAL ELECTRONICS	17.15020000
(3)	MACHINE SHOP	17.23020000
(4)	MILL WORK AND CABINET MAKING	17.36010000

Having passed the stage of sample analysis spanning a multitude of occupational Sub Groups, the Center requests that participating LEA's now address themselves to an in-depth treatment of at least three of the four previously mentioned Sub Group areas. It is hoped, however

that all participating schools will find it to their advantage to submit Behavioral Objectives covering other occupational areas as well. The Evaluation Service Center commits itself to the inclusion of such data in its information system in order to provide as extensive coverage as possible.

The following charts illustrate the organizational pattern adopted by ESCOE to achieve its goals.

ORGANIZATIONAL CHART

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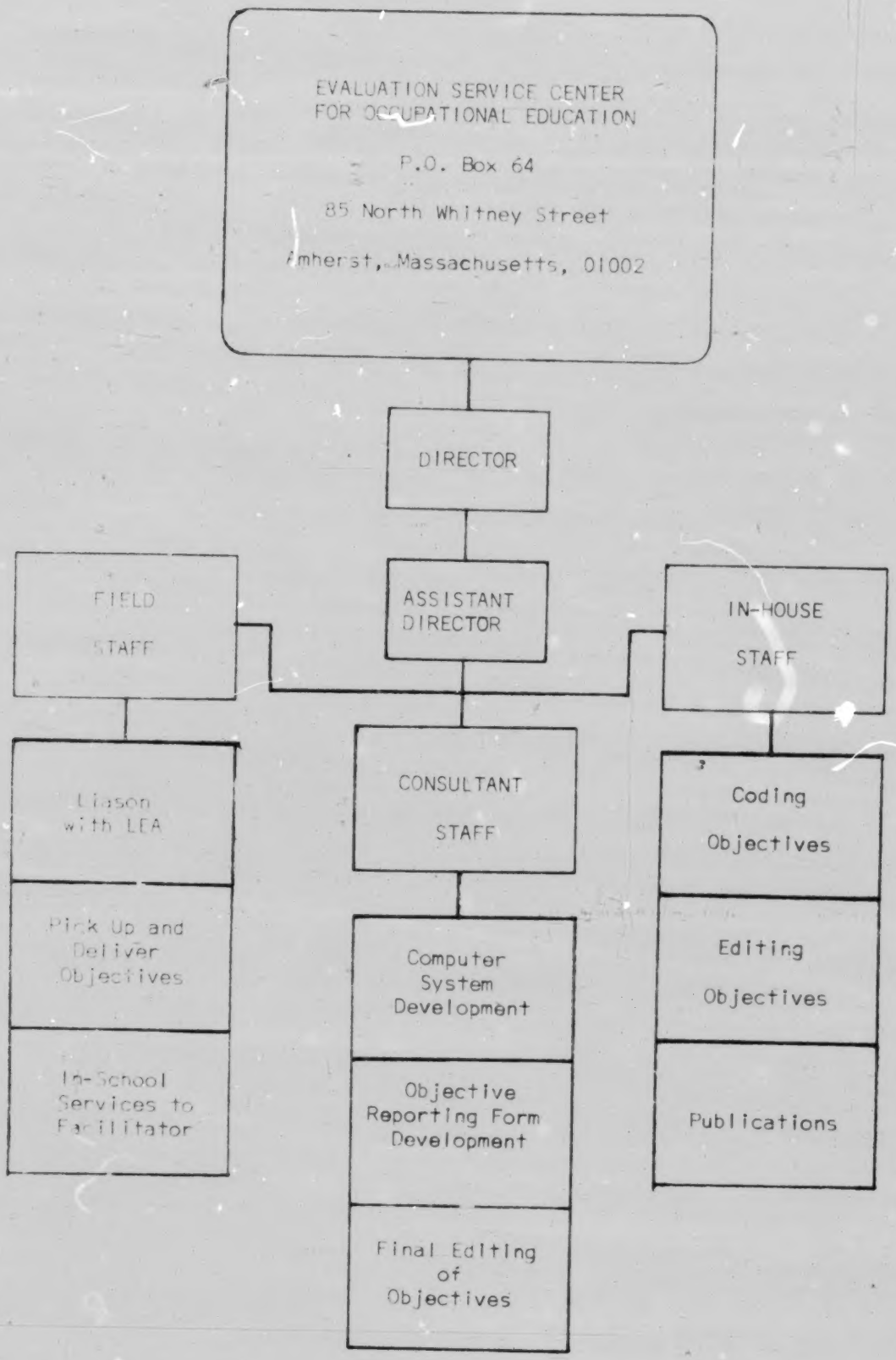
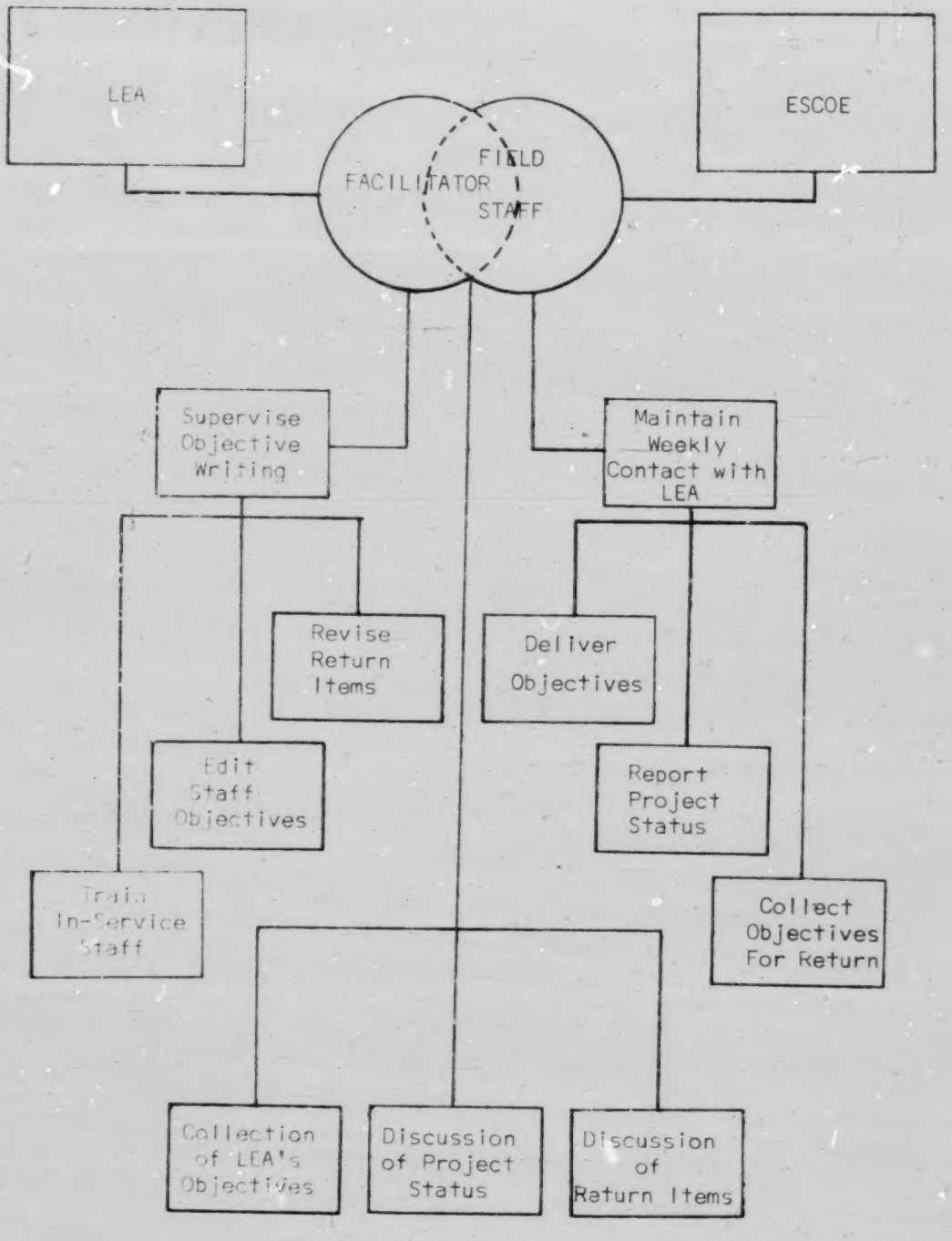
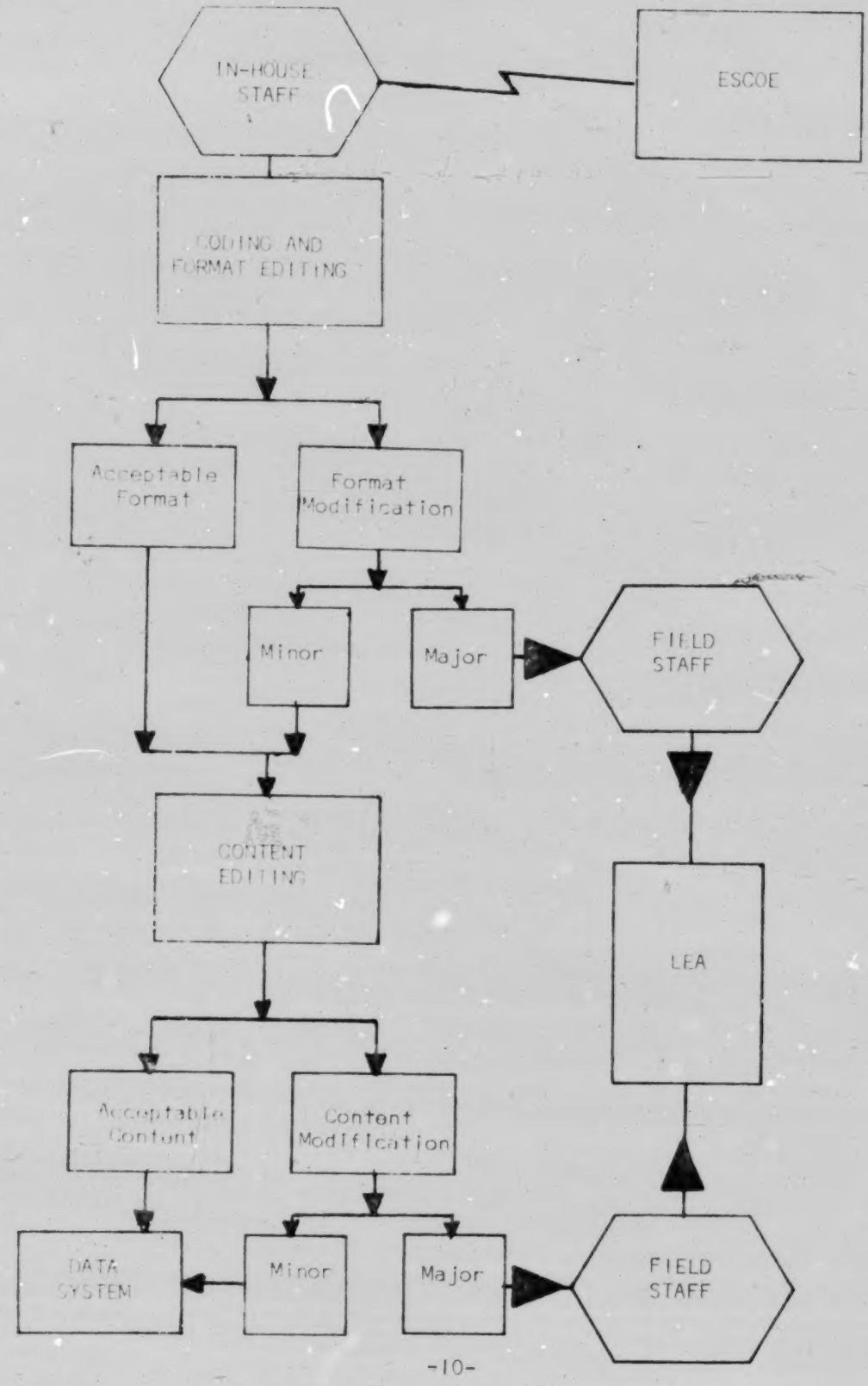


FACILITATOR/FIELD STAFF



BEHAVIORAL OBJECTIVE
EDITING PROCESS



The Evaluation Service Center is grateful for the helpful suggestions offered by the participating schools as well as by other interested parties during the developmental stages. These have been incorporated into the current Reporting Form #9 which appears in this Technical Report.

Technical Report #1 contains information absolutely necessary for correct reporting of Behavioral Objectives to ESCOE. The Center suggests that schools follow this chronological order when filling out Reporting Form #9.

First -- Fill in all single entry spaces located in the top third of the form, i.e, Field of Study, School, etc., with the exception of the Code line.

Second - Report the actual objective by first writing the desired Performance in the lines provided for that entry. This is the entry that actually spells out what it is that the student is required to do. Next, consider the Conditions under which the student is expected to perform the objective and enter them on the Condition lines. Then establish the Extent by stating the critera upon which the student's performance will be judged.

Third -- Do not fill in the last three entries on the front of the reporting form at this time. Sections 6-A and 6-B explain this in more detail.

Fourth - The upper part of the reverse side of the Reporting Form contains the Capability Classification reporting device. It is to be considered after the entire objective has been written, at which time it should be clear what kind of activity the objective verbalizes.

Fifth -- The Related Subject columns are to be filled in as a comprehensive overview of the objective.

This report has been arranged in the manner most closely resembling the chronological order outlined above.

Form #9

EVALUATION SERVICE CENTER
FOR OCCUPATIONAL EDUCATION

Behavioral Objective Reporting Form

Code No. Please refer to SECTION 1

Field of Study
Major Group } SECTION 2A
Sub Group

Block
Unit No. } SECTION 2B

Instructional Time SECTION 3

State
School } SECTION 4A

Instructor
Facilitator } SECTION 4B

Level SECTION 5

No. Taking Obj. SECTION 6A

School Year Written SECTION 6B

SECTION 7. Behavioral Objective

Condition(s)

Performance

Extent

Direct Prerequisite Unit(s)
Direct Dependent Unit(s) } SECTION 8A

Exit Behavior (Check One) Yes [ ] No [ ] SECTION 8B.

CAPABILITY CLASSIFICATION

SECTION 9A

Psychomotor

[ ] Psychomotor (Check only if performance requires a significant amount of muscular activity).

Cognitive

(Check the one cognitive capability that best describes the mental activity involved).

Knowledge Acquisition

[ ] C1.1 Knowledge of Specifics

[ ] C1.2 Knowledge of Ways & Means of Dealing with Specifics

Knowledge Application

[ ] C2.1 Knowledge Application Without Alteration

[ ] C2.2 Knowledge Application With Alteration

SECTION 9B.

Related Subject Discipline (Check those applicable)

MATHEMATICS

Elementary School Mathematics

[ ] Basic arithmetic & operations
[ ] Informal algebra
[ ] Informal geometry

Mathematics (7th & 8th grades)

[ ] Applied arithmetic
[ ] Geometry & measurement
[ ] Algebra, graphs, problem solving

Secondary School Mathematics

[ ] Algebra (first year)
[ ] Algebra (second year)
[ ] Algebra (third year)
[ ] Geometry
[ ] Trigonometry
[ ] Business Arithmetic
[ ] Consumer Mathematics
[ ] Shop Mathematics
[ ] Calculus
[ ] Computer Mathematics

OTHER
(Specify)

[ ] _____
[ ] _____
[ ] _____
[ ] _____

SCIENCE

[ ] General Science

Biology

[ ] General Biology
[ ] Anatomy
[ ] Bacteriology
[ ] Biochemistry
[ ] Ecology
[ ] Nutrition
[ ] Physiology

Chemistry

[ ] General Chemistry
[ ] Inorganic Chemistry
[ ] Qualitative Analysis
[ ] Quantitative Analysis
[ ] Materials Science

Physics

[ ] General Physics
[ ] Electricity & Magnetism
[ ] Electronics
[ ] Heat
[ ] Mechanics
[ ] Nuclear Science
[ ] Optics
[ ] Solid State Physics
[ ] Sound

SECTION I

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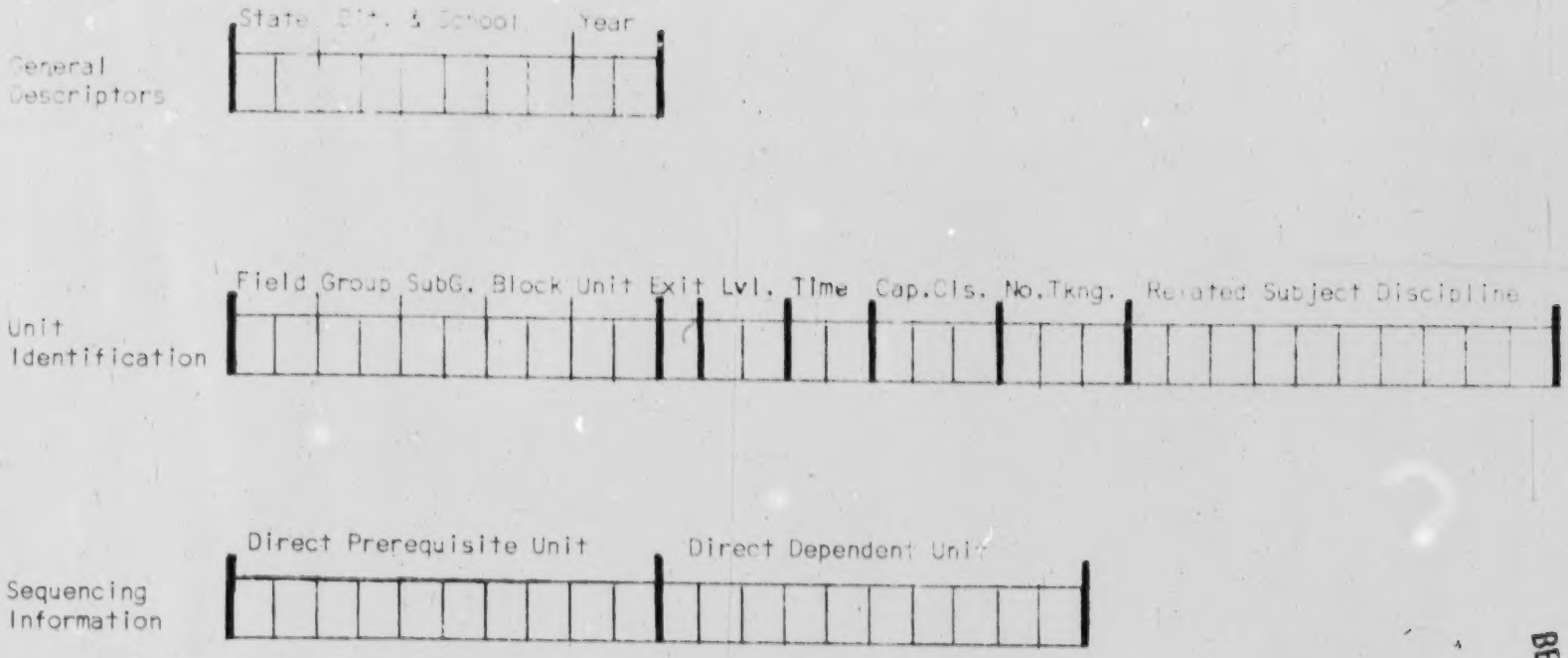
Code Number

The function of the code number is to allow the objective to be accessed in computer storage on a number of dimensions, for example; school, type of institution, level at which offered in occupational curriculum, type of capability (cognitive or psychomotor), etc. The code number will be, therefore, quite long. As of this publication, the exact order is not finalized, but the format shown on the following page is offered as an example.

Numbering codes follow the system developed by the National Center for Educational Statistics, U.S. Office of Education. Preliminary identification codes will be assigned by the Evaluation Service Center upon receipt of objectives. Over the first few months a numbering system for Blocks and Units within Sub Groups will be developed, and will appear on objectives returned to the participating schools.

The Code Number is a compilation of specific data entered by the LEA on the Behavioral Objective Reporting Form. It will be filled in by the Evaluation Service Center as an editorial checkpoint, and is not to be completed by the LEA.



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Proposed Code Number Structure

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SECTION 2A

It was determined at the Amherst Conference (January 1971) that the category breakdown for describing occupational employment areas would be as follows:

Field of Study -- Broadest area of employment as classified by the United States Office of Education Code.

Major Group -- Next largest classification of the USOE Code.

Sub Group -- Occupational groups within a Major Group, (using USOE Classification Code if existent).

SECTION 2B

Because the USOE coding system extends only to the occupational employment areas, it was further agreed that the terminology describing instructional segments would be:

Blocks -- Largest instructional segments of a Sub Group.

Unit -- Instructional segments within a Block.

Behavioral Objectives will be written within a Unit. The number of Behavioral Objectives written to completely describe a Unit may vary, depending on the tasks, skills, or operations necessary for mastery of the Unit. The performance of every task within the Unit must be included within the behavioral objectives at the unit level, so that "no task is untapped".

Regardless of the number of objectives submitted within a Unit, the number line (No. ___) should contain a number reflecting their order of presentation in the instructional program.

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ILLUSTRATIONS OF FIELD OF STUDY BREAKDOWN

Field of Study -- Trade and Industry

Major Group -- Automotive Industries

Sub Group -- Automotive Mechanics

Block -- Electrical System

Unit -- Ignition

Field of Study -- Trade and Industry

Major Group -- Electronics Occupations

Sub Group -- Industrial Electronics

Block -- Semi-conductor Circuits

Unit -- Diodes

Field of Study -- Trade and Industry

Major Group -- Metal Working Occupations

Sub Group -- Machine Shop

Block -- Lathe

Unit -- Straight Turning

Field of Study -- Trade and Industry

Major Group -- Woodworking Occupations

Sub Group -- Millwork and Cabinet-Making

Block -- Machines

Unit -- Mortiser

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Field of Study -- Technical

Major Group -- Engineering Related Technology

Sub Group -- Electronics Technology

Block -- Basic Electricity

Unit -- Direct Current

Field of Study -- Office Occupations

Major Group -- Stenographic, Secretarial and Related

Sub Group -- Secretaries

Block -- Legal Documents

Unit -- Wills

Field of Study -- Health Occupations

Major Group -- Nursing

Sub Group -- Practical Nursing

Block -- Medication

Unit -- Administering Medication

The succeeding section contains a partial listing condensed from Volume II, Standard Terminology for Curriculum and Instruction in Local and State School Systems, OE 23052 (Fourth Draft). If the Sub Group classifications in this partial list are not complete for your LEA's programs, the reference document introduced above is available through the U. Department of Health, Education, and Welfare.

SECTION 2C
OFFICE OF EDUCATION CODES

AGRICULTURE
(01.0000)

01.0100 Agricultural Production
01.0200 Agricultural Supplies
County Agent-Farm Insurance Adjuster
01.0300 Agricultural Mechanics
01.0400 Agricultural Products
01.0500 Ornamental Horticulture
01.0600 Agricultural Resources
01.0700 Forestry
01.9900 Other Agricultural (Specify)
Teacher-Farm Exam Officer

DISTRIBUTION & MARKETING
(04.0000)

04.0000 Marketing (General)
04.0500 Floristry - Horticultural Merchandizing
04.0600 Food Distribution
04.0800 General Merchandize Management (Gen./Mis.)
Mid Management
04.0900 Retailing (Gen./Mis.) N.E.C.
Fashion Retailing
04.9900 Other Instructional Programs (Specify)

HEALTH OCCUPATIONS
(07.0000)

07.0100 Dental Services
07.0101 Dental Asst.
07.0103 Dental Lab. Tech.
07.0199 Dental, Other
07.0200 Medical Services
07.0203 Medical Lab. Asst.
07.0299 Medical Services (Other)
07.0300 Nursing
07.0302 Practical (Voc.) Nursing
07.0399 Nursing (Other)

HOME ECONOMICS

09.0100 Homemaking - Preparation for Personal, Home and Family Living
09.0101 Comprehensive Homemaking or Home Economics
09.0102 Child Development
09.0103 Clothing and Textiles
09.0104 Consumer Education
09.0105 Family Health
09.0106 Family Relations
09.0107 Foods and Nutrition
09.0108 Home Management
09.0109 Housing and Home Furnishing
09.0199 Other Homemaking (Specify)

(HOME ECONOMICS) Cont'd.

09.0200 Occupational Preparation
- 09.0201 Care and Guidance of Children
- 09.0202 Clothing Management, Production & Services
- 09.0203 Food Management, Production & Services
- 09.0204 Home Furnishings, Equipment & Services
- 09.0205 Institutional and Home Management & Supporting Services
- 09.0299 Other Occupational Preparation (Specify)

OFFICE OCCUPATIONS
(14.0000)

14.0100 Accounting & Computing
14.0200 Business Data Processing Systems
14.0300 Filing, Office Machines, Gen. Office Clerical and Typing
14.0700 Stenographic, Secretarial and Related
14.9900 Other (Specify)

TECHNICAL

16.0100 Engineering Related Tech.
- 16.0102 Agricultural Tech.
- 16.0103 Architectural Tech. (Building Construction)
- 16.0106 Civil Tech.
- 16.0107 Electrical Tech.
- 16.0108 Electronics Tech.
- 16.0109 Electro-Mechanical Tech.
- 16.0111 Industrial Tech.
- 16.0112 Instrumentation Tech.
- 16.0113 Mechanical Tech.
- 16.0114 Metallurgical Tech.
- 16.0117 Scientific Data Processing
- 16.0199 Other Related - Optics Tech., Welding Tech.

TRADES & INDUSTRY
(17.0000)

17.0100 Air Conditioning
- 17.0101 Cooling
- 17.0102 Heating
- 17.0103 Ventilating (filtering & humidification)
- 17.0199 Other Air Conditioning

17.0200 Appliance Repair
- 17.0201 Electrical Appliance

17.0300 Automotive Industries
- 17.0301 Body & Fender
- 17.0302 Mechanics
- 17.0399 Other Automotive Industries (Specify)

17.0700 Commercial Art Occ.
17.0701 Interior Decorating
17.0702 Window Display
17.0703 Product Design
17.0799 Commercial Art Occ. - Other
17.1000 Construction & Maintenance Trades
17.1001 Carpentry
17.1002 Electricity
17.1005 Painting & Decorating
17.1007 Plumbing & Pipefitting
17.1099 Construction & Maintenance - Other
17.1300 Drafting Occupation
17.1400 Electrical Occupations
17.1401 Industrial Electrician
17.1499 Other Electrical Occ.
17.1500 Electronics Occ.
17.1501 Communications
17.1502 Industrial
17.1599 Other Electronics Occ. (Specify)
17.1900 Graphic Arts Occ.
17.1901 Composition, Makeup & Typesetting
17.1902 Printing Press Occ.
17.1903 Lithography, Photography & Platemaking
17.1904 Photoengraving
17.1905 Silk Screening Making & Printing
17.1999 Graphic Arts - Other Offset
17.2300 Metalworking Occ.
17.2302 Machine Shop
17.2303 Machine Tool Operation
17.2305 Sheet Metal
17.2306 Welding & Cutting
17.2399 Other Metalworking Occ. (Specify)
Precision Sheet Metal
Metal Fabrication
17.2600 Personal Services
17.2602 Cosmetology
17.2699 Other Personal Services (Specify)
17.2800 Public Service
17.2801 Fireman Training
17.2899 Other Public Services (Specify)
17.2900 Quantity Food Occ.
17.2901 Baker
17.2902 Cook/Chef
17.2904 Waiter/Waitress
17.2999 Quantity Food Occ. - Other
17.3100 Small Engine Repair (Internal Combustion)
17.3300 Textile Production & Fabrication
17.3301 Dressmaking
17.3399 Other Textile Production & Fabrication - (Specify)
17.3400 Leatherworking
17.3401 Shoe Manufacturing
17.3402 Shoe Repair
17.3600 Woodworking Occ.
17.3601 Millwork & Cabinet-making
17.3699 Other Woodworking Occ. (Specify)
Patternmaking
House Carpentry

SECTION 3

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INSTRUCTIONAL TIME

Instructional Time is defined as the length of in-school time provided for teaching a particular objective, which includes lectures, demonstrations, practice, or any planned instructional activity. In many cases there is considerable variance as to the amount of Instructional Time for individual students within a class for a particular objective, while in other cases Instructional Time is the same for all students within a class for a particular objective. In some cases the range of Instructional Time is minimal, in others it is great.

This entry on the Behavioral Objective Reporting Form seeks to record the length of Instructional Time provided for each objective on the grounds that such information is useful for curriculum analysis. Therefore, one of three cases of Instructional Time may be entered on the Behavioral Objective Reporting Form; first when the Instructional Time is the same for all students, second when the range of Instructional Time for all students within a class is within a limited range, and third if the Instructional Time varies greatly.

Finally, all Instructional Time is to be expressed in minutes such that a mathematical common denominator is established.

Case A: If Instructional Time is the same for all students seeking a particular objective within the school, specify the Instructional Time in minutes, followed by an A. For example: If the Instructional Time for an objective is two lectures at 40 minutes each, two demonstrations at 10 minutes, and one film at 30 minutes, and if the same Instructional Time

is provided for all students, enter 130 A.

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Case B: If Instructional Time is the same for all students seeking a particular objective, ± ten (10) minutes, specify the Instructional Time in minutes, followed by B. For example: If the Instructional Time for an objective included one 50-minute lecture, followed by a 30-minute (± 10 minutes) practice session, depending on student requirements, enter 80 B.

Case C: If the Instructional Time varies more than ± 10 minutes for students seeking a particular objective, do not give a time in minutes; enter only the letter C. For example, an instructor may give individual instruction to his shop students on how to lay out and cut a hip rafter, and the time might vary from 10 minutes to 50 minutes, according to student ability. In this situation the entry would be only the letter C.

SECTION 4

STATE, SCHOOL, INSTRUCTOR, FACILITATOR

A. State

Enter the name of the state in which the participating school is located.

School

Enter the name of the participating school or LEA.

B. Instructor

The name of the person who has written the Behavioral Objective is requested to enable the Evaluation Service Center and facilitator to contact that person if questions arise concerning a particular Behavioral Objective. This information will only be available as the objective is being edited and will never enter the actual data system.

Facilitator

Enter here the name of the person responsible for submitting the Behavioral Objective to the Evaluation Service Center. Again, this information is only necessary to enable the Center to contact the facilitator and instructor during the editing process.

SECTION 5

LEVEL

This is to provide information pertaining to the type of program the school provides and level of the program at which the behavioral objective is offered. The first digit represents the program level and length, and the second digit represents the year in which the behavioral objective is offered in the program. The following is the numerical sequences assigned to the various types of programs:

Program Level	Year Offered	Type of Program Represented
0	0	Pre-Vocational, including exploratory
1	1	Secondary School, 1 year program
2	1	Secondary School, 1st year of a 2 year program
2	2	Secondary School, 2nd year of a 2 year program
3	1	Secondary School, 1st year of a 3 year program
3	2	Secondary School, 2nd year of a 3 year program
3	3	Secondary School, 3rd year of a 3 year program
4	1	Secondary School, 1st year of a 4 year program
4	2	Secondary School, 2nd year of a 4 year program
4	3	Secondary School, 3rd year of a 4 year program
4	4	Secondary School, 4th year of a 4 year program
5	1	Pre-postsecondary program
6	1	Postsecondary School, 1st year of a 1 year program
7	1	Postsecondary School, 1st year of a 2 year program
7	2	Postsecondary School, 2nd year of a 2 year program
8	1	Other

BEST COPY AVAILABLE

A: Number Seeking Objective

This is a prediction based on the best evidence available as to how many students will accomplish this objective within the next school year. For instance, if you anticipate that 25 students will enroll in a course that includes this objective, and that the course will be taught twice within the next school year, you would indicate 50 as the Number Seeking Objective.

If the pursuit of the objective is significantly dependent on production, that is, if fixing radiator leaks is dependent on the number of jobs entering the shop for radiator work, you should respond with a "P" to indicate production, and then provide the best estimate you can make as to how many students will likely actively pursue this objective within the following school year. For instance, if you have 50 students in a class and your best guess is that 33 of them will have an opportunity to pursue this objective you would indicate P/33. The P warns the reader that the objective is entirely based on production and that the following number is an estimate.

B: School Year Written

Enter here the year in which the Behavioral Objective was written. This information is requested to identify the year the Objective was entered into the data bank; this is based on the assumption that such information is necessary for future out-put concerning popularity and longevity.

SECTION 7

BEHAVIORAL OBJECTIVES

What Are Behavioral Objectives?

They are statements which describe what students will be able to do after completing a prescribed unit of instruction. They make clear to teachers, students, and other interested persons exactly what needs to be or what has been taught and may be used by instructors to design and evaluate that instruction.

Well-Written Behavioral Objectives Should State:

1. Statement of performance expected.
2. Conditions under which the performance will take place.
3. The extent or degree to which the student will perform.

1. Performance means doing. To measure performance, it must be observable. Thus the statement must specify some sort of behavior that can be observed.

Good Verbs		Poor Verbs
Explain	Pronounce	Knows
Define	Identify	Comprehends
Cut	Adjust	Understands
Compute	Sew	

2. Conditions means stating all the "givens" and "restrictions" which pertain to the expected student performance. Obvious conditions such as "pencil and paper" and "common tools" need not be stated.

Given:

Data	Instructions	Torque Wrench
Problems	Blueprint	Machine
Fabric	Picture	Stock

Restrictions:

Without the aid of reference tables.

From memory.

Without color guides.

3. Extent establishes acceptable minimum standards of achievement on the objective. Specify the criteria upon which the instructor judges the performance.

Examples:

Number of erasures.

Smoothness of cut.

± 1/1000".

4 out of 5.

Maximum of 3 errors.

90%.

It is better to overstate an objective rather than to understate, as long as the information is not nebulous or ambiguous. The following nine pages show the evolution of three behavioral objectives as they pass through the editing process. The hand-written notes indicate comments made by the Editorial Staff as the objectives are screened.

Form #9

OBJECTIVE A.1

EVALUATION SERVICE CENTER
FOR OCCUPATIONAL EDUCATION

Behavioral Objective Reporting Form

Code No. _____

Field of Study TRADE & INDUSTRY

Major Group ELECTRONICS OCCUPATIONS

Sub Group INDUSTRIAL ELECTRONICS

Block ELECTRON FLOW IN COMPONENTS

Unit INDUCTANCE No. _____

Instructional Time 1/2 HOUR

State _____

School _____

Instructor _____

Facilitator _____

Level _____

No. Taking Obj. _____

School Year Written _____

Behavioral Objective

Condition(s) Given proper material, instruments and instructions

Performance Learn how a magnetic field may be used to induce a voltage in a conductor, factor affecting strength and direction of the induced voltage, and the effects of self and mutual inductance in a D.C. circuit.

Extent Circuits connected correctly and proper data and understanding.

Direct Prerequisite Unit(s) _____

Direct Dependent Unit(s) _____

Exit Behavior (Check One) Yes [ ] No [ ]

Form #9

OBJECTIVE A.2

EVALUATION SERVICE CENTER
FOR OCCUPATIONAL EDUCATION

Behavioral Objective Reporting Form

Code No. _____

Field of Study TRADE & INDUSTRY

Major Group ELECTRONICS OCCUPATIONS

Sub Group INDUSTRIAL ELECTRONICS

Block ELECTRON FLOW IN COMPONENTS

Unit INDUCTANCE No. _____

Instructional Time 1/2 HOUR

State _____

School _____

Instructor _____

Facilitator _____

Level _____

No. Taking Obj. _____

School Year Written _____

Could you indicate what material (briefly).

Behavioral Objective

Condition(s) Given proper material, instruments and instructions.

How should student demonstrate his learning?

Performance (1) (Learn how a magnetic field may be used to induce a voltage in a conductor) (2) (factor affecting strength and direction of the induced voltage) and (3) (the effects of self and mutaul inductance in a D.C. circuit)

There appear to be three objectives

Extent Circuits connected correctly and proper data and understanding. What constitutes "correctly" as to connections, data. Understanding should be demonstrable in performance.

Direct Prerequisite Unit(s) _____

Direct Dependent Unit(s) _____

Exit Behavior (Check One) Yes [ ] No [ ]

Form #9

EVALUATION SERVICE CENTER
FOR OCCUPATIONAL EDUCATION

OBJECTIVE A.3

Behavioral Objective Reporting Form

Code No. _____

Field of Study TRADE & INDUSTRY

State _____

Major Group ELECTRONICS OCCUPATIONS

School _____

Sub Group INDUSTRIAL ELECTRONICS

Instructor _____

Block ELECTRON FLOW IN COMPONENTS

Facilitator _____

Unit INDUCTANCE No. _____

Level _____

Instructional Time 1/2 HOUR

No. Taking Obj. _____

School Year Written _____

Behavioral Objective

acceptable format

Condition(s) GIVEN A MILLIAMMETER, 2 FEET #18 BARE WIRE AND A PERMANENT MAGNET.

Performance The student will set up circuit so that crossing path of conductor with magnet will cause deflection of ammeter (indicating current flow).

Extent Measured deflection.

Direct Prerequisite Unit(s) _____

Direct Dependent Unit(s) _____

Exit Behavior (Check One) Yes [ ] No [ ]

Form #9

EVALUATION SERVICE CENTER
FOR OCCUPATIONAL EDUCATION

OBJECTIVE B 1

Behavioral Objective Reporting Form

Code No. ___ - _____

Field of Study TRADE & INDUSTRY

State _____

Major Group METAL WORK OCCUPATION

School _____

Sub Group MACHINE SHOP

Instructor _____

Block ~~NON-~~ ENGINE LATHE

Facilitator _____

Unit TEMPLATE TAPER No. _____

Level _____

Instructional Time 15 MINUTES

No. Taking Obj. _____

School Year Written _____

Behavioral Objective

Condition(s) Given a piece of steel

Performance The student will turn a taper to the given dimensions using the compound of the lathe, holding the diameters and length in ± 1/64" and the included angle in ± 1/2°.

Extent _____

Direct Prerequisite Unit(s) _____

Direct Dependent Unit(s) _____

Exit Behavior (Check One) Yes [ ] No [ ]

Form #9

EVALUATION SERVICE CENTER
FOR OCCUPATIONAL EDUCATION

OBJECTIVE B.2

Behavioral Objective Reporting Form

Code No. _____

Field of Study TRADE & INDUSTRY

State _____

Major Group METAL WORK OCCUPATION

School _____

Sub Group MACHINE SHOP

Instructor _____

Block ENGINE LATHE

Facilitator _____

Unit TEMPLATE TAPER No. _____

Level _____

Instructional Time 45 MINUTES

No. Taking Obj. _____

School Year Written _____

Behavioral Objective

Condition(s) Given a piece of steel.

Performance The student will turn a taper to the given dimensions using the compound of the lathe [holding the diameters and length in ± 1/64" and the included angle in ± 1/2°]

There is no blueprint or other instructions noted — what are the dimensions?

Extent [holding ---- ---- angle in ± 1/2°]

Direct Prerequisite Unit(s) _____

Direct Dependent Unit(s) _____

Exit Behavior (Check One) Yes [ ] No [ ]

Form #9

OBTECTIVE B.3

EVALUATION SERVICE CENTER
FOR OCCUPATIONAL EDUCATION

Behavioral Objective Reporting Form

Code No. _____

Field of Study TRADE & INDUSTRY

Major Group METAL WORK OCCUPATION

Sub Group MACHINE SHOP

Block ENGINE LATHE

Unit NON-TEMPLATE TAPER No. _____

Instructional Time 90 MINUTES

State _____

School _____

Instructor _____

Facilitator _____

Level _____

No. Taking Obj. _____

School Year Written _____

Behavioral Objective

Condition(s) Given a piece of steel, lathe and tool bit and choice of measurement tools.

Performance USING TAILSTOCK, THE STUDENT WILL BE ABLE TO TURN A TAPER OF 0.250"/FT. OVER A LENGTH OF 5-3/32" FROM A DIAMETER OF 1.555" AT CHUCK END.

Extent Diameter and length ± 1/64".

Direct Prerequisite Unit(s) _____

Direct Dependent Unit(s) _____

Exit Behavior (Check One) Yes [ ] No [ ]

Form #9

EVALUATION SERVICE CENTER
FOR OCCUPATIONAL EDUCATION

OBJECTIVE C.1

Behavioral Objective Reporting Form

Code No. _____

Field of Study TRADE & INDUSTRY

Major Group AUTOMOTIVE INDUSTRIES

Sub Group AUTOMOTIVE MECHANICS

Block MANUAL TRANSMISSIONS

Unit COMPLETE OVERHAUL AND DIAGNOSIS No. _____

Instructional Time _____

State _____

School _____

Instructor _____

Facilitator _____

Level _____

No. Taking Obj. _____

School Year Written _____

Behavioral Objective

Condition(s) Given a standard three speed transmission and a set of tools.

Performance the student shall be able to diagnose and overhaul.

Extent with precision the complete transmission in a three hour lab.

Direct Prerequisite Unit(s) _____

Direct Dependent Unit(s) _____

Exit Behavior (Check One) Yes [ ] No [ ]

Form #9

OBJECTIVE C.2.

EVALUATION SERVICE CENTER
FOR OCCUPATIONAL EDUCATION

Behavioral Objective Reporting Form

Code No. ____

Field of Study TRADE & INDUSTRY

Major Group AUTOMOTIVE INDUSTRIES

Sub Group AUTOMOTIVE MECHANICS

Block MANUAL TRANSMISSIONS

Unit COMPLETE OVERHAUL AND DIAGNOSIS No. ____

Instructional Time ____

State ____

School ____

Instructor ____

Facilitator ____

Level ____

No. Taking Obj. ____

School Year Written ____

Behavioral Objective

Condition(s) Given a standard three speed transmission and a set of tools.

Diagnose what?

Performance The student shall be able to diagnose and overhaul.

What is the measurement of precision?

Extent With precision the complete transmission in a three hour lab.

Direct Prerequisite Unit(s) ____

Direct Dependent Unit(s) ____

Exit Behavior (Check One) Yes [ ] No [ ]

AVA & INDUSTRY

Major Group AUTOMOTIVE INDUSTRIES

Sub Group AUTOMOTIVE MECHANICS

Block MANUAL TRANSMISSION

Unit COMPLETE DIAGNOSIS AND OVERHAUL No.

Instructional Time HOUR

State

School

Instructor

Facilitator

Level

No. Taking Obj.

School Year Written

Behavioral Objective

Condition(s) Given a standard three-speed manual transmission and access to all necessary tools and replacement shafts, gears, seals, bearings, forks and housings.

Performance The student shall be able to diagnose any malfunction and overhaul the transmission.

Extent SO THAT IT IS OPERATIONAL IN ALL 4 MODES AND NEUTRAL, WITH NO [illegible] SIBLE DRAG BY HAND TURNING OF EITHER INPUT OR OUTPUT SHAFTS [illegible] AL OR DRAG OF SHIFT FORKS, TIPS OF BOTH SHAFTS MUST RUN TRUE TO ± .003". TO BE COMPLETED WITHIN 3 HOURS.

→ acceptable format

Prerequisite Unit(s)

Concurrent Dependent Unit(s)

Exit Behavior (Check One) Yes [ ] No [ ]

SECTION 8A

DIRECT PREREQUISITE UNIT(S) AND DIRECT DEPENDENT UNIT(S)

The entries on these lines should not be filled out when initially submitting an objective to the Evaluation Service Center. They will be deferred, instead, until the time when all Objectives for a Sub Group have received final editing approval from ESCOE. At that time, the objectives will be returned to the LEA and the instructor(s) will sequence the Unit objectives within each Block and will make the required Direct Prerequisite and Direct Dependent notations.

A Direct Prerequisite Unit is that Unit upon which the successful completion of a stated Behavioral Objective is directly dependent. This entry is made referencing Units, not specific Objectives, if the Prerequisite Unit is in another Block, reference both the Unit and Block.

A Direct Dependent Unit is that Unit which is immediately dependent upon the mastery of the stated Behavioral Objective. Again, referencing is requested at the Unit level.

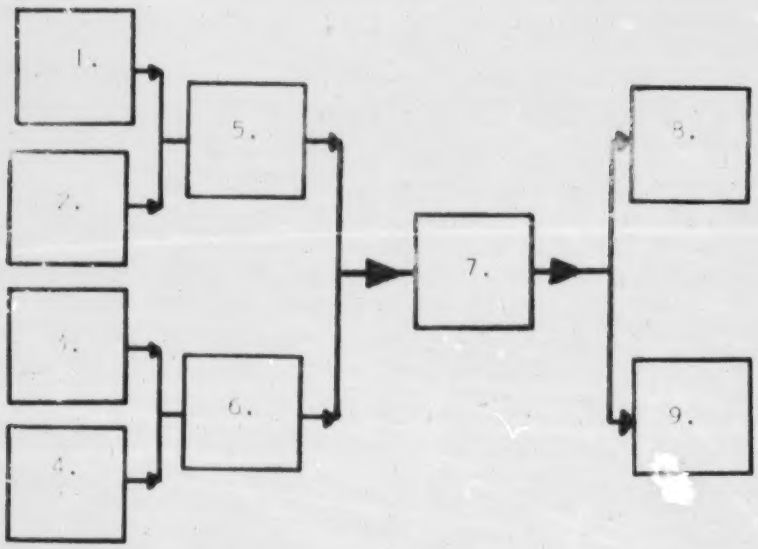
It may be observed that any Objective which records a specific Unit as either Directly Prerequisite or Directly Dependent will likewise be referenced (through its Unit) as either Directly Prerequisite or Directly Dependent to an Objective within both of those Units.

If Unit A is Prerequisite to Unit B and Unit C is Directly Dependent on Unit B then Unit B must be listed as Directly Dependent on an objective within Unit A and Prerequisite to an objective in Unit C.

In the following illustration, let us assume that the instructor is working on an objective within Unit Number 7. All units represented by numbers less than 7 are prerequisite to Unit 7, and all units greater than 7 are dependent upon Unit 7. The Center requests that only Direct Prerequisite Units be entered on the Reporting Form. In this illustration only Units numbered 5 and 6 are directly prerequisite to that objective in Unit 7 and only those two entries should appear on the Form. Units 1 through 4 are not directly prerequisite and shold not appear.

Likewise numbers 8 and 9 are both dependent and directly dependent on Unit 7. Both Units 8 and 9 should be entered on the Reporting Form as Directly Dependent Units.

Figure 1



SECTION 8B

EXIT BEHAVIOR

If the objective describes or infers a capability which is an important part of the student's specific occupational competency at the termination of his training experience and if the capability can not be inferred from higher order objectives, then the objective will be considered as Exit Behavior. Therefore, the objective would be an Exit Behavior if there were no Dependent objectives listed.

For example, the following Objective in the Pedicure Unit (Cosmotology) would be Exit Behavior because there are no Dependent Objectives which rely on capabilities learned in the Pedicuring Unit.

Given a patron and necessary tools and materials, the student will perform a complete pedicure ----.

All the tasks within this objective are inferred from Manicuring objectives, therefore Manicuring objectives would not be Exit Behavior.

SECTION 9A

CAPABILITY CLASSIFICATION SYSTEMS

Introduction

The purpose of this section is to present a classification system for behavioral objectives or, more specifically, for capabilities which educational problems are designed to produce. The Evaluation Service Center is deeply indebted to the author of this section William Conroy Jr. (Director of the Research Coordinating Unit, Massachusetts Department of Education).

The following list of publications are also valuable in this area:

(1) Ammerman, Harry L. — The Derivation, Analysis, and Classification of Instructional Objectives, Technical Report 66-4, HumRRO Division No. 5 (Air Defense), Fort Bliss, Texas Prepared for: Office, Chief of Research and Development, Department of the Army, Contract DA 44-188-ARO 2 (DA Proj. 25024701A712 01)

(2) Bloom, Benjamin S. — A Taxonomy of Educational Objectives: Handbook I: Cognitive Domain, David McKay Company, Inc., New York, 1956

(3) Conroy, William G., Jr. — Massachusetts and New York Evaluation Service Center for Occupational Education, A Planning Document, the University of the State of New York, the State Education Department, Bureau of Occupational Education Research, Albany, New York, May 1970

(4) Gagne, R. W. — The Conditions of Learning, New York: Holt, Rinehart & Winston, 1965

(5) Krathwohl, David R. — Taxonomy of Educational Objectives: Handbook II: Affective Domain, David McKay Company, Inc., New York, 1964

(6) Simpson, Elizabeth Jane — "The Classification of Educational Objectives, Psychomotor Domain", Illinois Teacher of Home Economics, Vol. X, No. 4, Winter 1966-67

Important Definitions

Given a definition of capabilities as things persons can and/or will do, all education, including occupational education, is in the business of capability production. The capabilities an educational process seeks to establish in its product, i.e. students, are ultimately derived from values that society considers important. Frequently, the values are not rationally articulated, but few would argue that American society places a high value on occupational competency. This paper is not concerned with examining this assumption, but merely seeks to acknowledge its existence.

Often capabilities are invisible, i.e. they cannot be directly observed. In these cases, capabilities are inferred from things people do, i.e. behavior. All behavior is essentially motor, i.e. muscular movement. Behavioral objectives are usually described as explicit statements of expected student behavior an educational program seeks to attain or, simply, what the students can do at the end of an educational program that he couldn't do before it began. The intervening educational program is usually praised or blamed as the causal variable.

This paper stipulates three distinct types of capabilities:

I. Cognitive Capabilities - the ability to do things that are mostly intellectual or mental in nature. In general, cognitive capabilities involve acquiring and applying knowledge or information.

II. Psychomotor Capabilities - the ability to do things that are mostly muscular in nature, but which ensue from cog-

nitive capabilities. In general, psychomotor capabilities involve manipulating objects with various parts of the body.

III. Affective Capabilities - the ability to do things that are mostly emotional in nature. In general, affective capabilities involve acquiring a positive or negative feeling toward a particular object.

Psychomotor capabilities can be observed directly, while cognitive and affective capabilities must be inferred from behavior. Therefore, a behavioral objective describes a psychomotor capability, but cognitive and affective capabilities must be inferred from behavioral objectives. Although all behavior described in behavioral objectives is essentially psychomotor, i.e. muscular movements ensuing from mental activity, behavioral objectives can be classified as either cognitive, affective or psychomotor. When the muscular movement is fundamentally a means of communicating a mental or emotional capability, the objective is cognitive or affective. When the muscular movement described by the behavioral objective is, in fact, the capability sought by the instructional program, the behavioral objective is psychomotor.

The following is the Capability Classification System to be used by the Evaluation Service Center. It is consistent with the check list to be found on Behavioral Objective Form #9.

I. Cognitive Capabilities*

Two major categories of cognitive capabilities are specified:

*Modified from: Bloom, Benjamin S., A Taxonomy of Educational Objectives: Handbook I: Cognitive Domain, David McKay Company, Inc., New York, 1956

(1) Knowledge Acquisition; (2) Knowledge Application; with two cognitive capabilities stipulated within each major category.

KNOWLEDGE ACQUISITION

Knowledge acquired is knowledge stored or filed, such that it can be recalled at the discretion of the individual. The cognitive capability is the ability to maintain and recall knowledge. Since stored knowledge cannot be observed it must be inferred from recalling or remembering behavior. Further, if knowledge cannot be recalled it is not possible to measure its existence. Therefore, knowledge is defined as that information which can be recalled, while the cognitive capability remains the maintenance and recall of knowledge. Behavioral objectives from which knowledge can be inferred describe the process of knowledge recall. Two kinds of knowledge are defined:

C1.1 Knowledge of Specifics: This includes facts and specific information. For example, names, dates, places, events, technical and trade terminology, etc. The capability might be knowledge of (i.e., to have on file and be able to recall) the parts of an automobile carburetor. A behavioral objective would describe a recall process from which the capability would be inferred. The recall process might be to name, to identify, to list, to select, or to point to all the parts of an automobile carburetor.

C1.2 Knowledge of Ways and Means of Dealing with Specifics: Knowledge within this category is more abstract than knowledge of specific facts. Knowledge within this category would include classification systems, criteria by which specific facts and information are tested,

methods of inquiry for obtaining knowledge or information, and principles and theories by which information is organized on the very highest level. This category does not include capabilities to apply or use ways and means of dealing with specific knowledge, but is limited to knowledge of ways and means of dealing with specific knowledge, i.e. to have on file and be able to recall ways and means of dealing with specific knowledge. Behavioral objectives would describe the recall process from which the knowledge capability could be inferred. Examples of behavioral objectives in this category would be:

(1) The student will name the botanical and zoological classification system in descending order.

(2) The student will list steps in detecting the amount of antifreeze in an automobile radiator.

(3) The student will list the steps by which social scientists develop knowledge.

(4) The student will name the principles of chemistry which are relevant to the life process.

(5) The student will identify a specific and complex description of the theory of evolution.

KNOWLEDGE APPLICATION (PROBLEM-SOLVING)

Knowledge is applied or used to solve problems or reach goals. Cognitive capabilities in this category refer to the ability to use or apply knowledge in problem-solving or goal attainment in a pur-

useful way. Since one cannot directly observe this capability, one must infer its existence from a behavior. Behavioral objectives in this category, therefore, specify the kinds of behavior from which this inference can be made. Although the behavior has varying degrees of muscular activity, its function is to describe a cognitive capability, i.e. the ability to apply knowledge to solve problems or attain goals.

Two distinct kinds of knowledge application are stipulated: Knowledge Application Without Alteration and Knowledge Application With Alteration.

C2.1 Knowledge Application Without Alteration - Knowledge Application Without Alteration describes an ability to use or apply knowledge in a straightforward way to any situation. What is intended in this category is a cybernetic process, i.e. when presented with a problem or goal, the problem-solving response is to sort through knowledge, recognize the correct knowledge to apply, call up and apply the knowledge and thereby solve the problem or reach the goal. The knowledge is unaltered when applied. This capability could involve the application of little or much knowledge. The chief characteristic of this category is Knowledge Application Without Alteration. Knowledge application in this category usually involves a sequential, checklist process, i.e. if this condition exists, then that solution applies, with that solution already existing as stored knowledge.

Examples of objectives in this category might be: for a computer programmer to apply a known routine to solve a particular data processing problem; for an accountant to apply learned depreciation methods or cost analysis formulas to analyze an institution's fiscal position; or for a researcher to apply a stored statistical formula to test a hypothesis. Unaltered, applied knowledge can be from memory, non-memory or a combination of both. Non-memory knowledge is information called up from such sources as texts, manuals, tables, etc.

A problem solving situation within this category would be something like the following:

1. The problem is recognized.
2. A search of memory and/or non-memory knowledge is made.
3. Memorized and/or non-memorized knowledge will solve the problem.
4. Memorized and/or non-memorized knowledge is applied to solve the problem.

C2.2 Knowledge Application With Alteration - The chief characteristic of this cognitive capability is the need to alter existing knowledge in order to solve a problem. This problem solving cognitive capability includes both alteration and application, whereas Knowledge Application Without Alteration describes a cognitive capability in which knowledge is applied without being altered, i.e. in a straightforward way. Perhaps the best way to specify this cognitive category is to outline the problem-solving process which typifies this cognitive capability:

1. The problem is recognized.
2. A search of knowledge is made.
3. Knowledge does not offer solution.
4. Knowledge is altered.
5. Altered knowledge is applied to solve the problem.

Two methods of knowledge alteration are stipulated:

Analysis - Analysis involves breaking stored knowledge into its constituent parts such that detection of the relationships between the parts can be recognized. This could involve analyzing elements within existing knowledge, analyzing the organizing principles of existing knowledge.

Synthesis - Synthesis involves assembling isolated and specific pieces of knowledge to form a new whole. This is a combining process, which could involve considerable creativity. Synthesis of existing knowledge results in new knowledge, new plans or new understandings of relationships between elements.

Behavioral objectives from which the capability of Knowledge Application With Alteration is inferred describes something of a hypothesis testing behavior in which existing knowledge is analyzed and synthesized such that new knowledge is produced to solve a problem or attain a goal. A very different modus operandi is involved in Knowledge Application With Alteration than with Knowledge Application Without Alteration. In Knowledge Application Without Alteration, the capability involves only search and application, while in Knowledge Application With Alteration the capability involves search,

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alteration and application. A well known example of this capability is: Given a certain mathematical principle, a student will demonstrate that the following statement, in which a and b are rational numbers, is true:

$$(a+b)2 = a \cdot 2 + b \cdot 2$$*

If the student had previously stored the step by step information of solving the problem, this objective would infer the cognitive capability of Knowledge Application Without Alteration. If, on the other hand, the student had to alter existing knowledge to arrive at the solution, then the objective would be properly classified in the category of Knowledge Application With Alteration.

II. Psychomotor Capabilities

No attempt is made to distinguish among the relative complexity of psychomotor capabilities in the Capability Classification System. Psychomotor capabilities are either simple or complex and the simplicity or complexity of the psychomotor capability is obvious from the description of the capability. For example, hammering a nail into a wall is a relatively simple psychomotor act, while swimming the English Channel on one's back and juggling a mermaid, a monkey, and a martini is complex.

Psychomotor behaviors or capabilities are essentially special cases of knowledge application, with the application involving largely muscular movement. It is therefore possible to differentiate among psychomotor capabilities by the related cognitive competency required

*Gagne, R. M., The Conditions of Learning. New York: Holt, Rinehart & Winston, 1965.

to perform the psychomotor behavior. Specifically, psychomotor capabilities are a function of either Knowledge Application With Alteration or Knowledge Application Without Alteration.

The same psychomotor behavior could be the function of different cognitive behaviors, and this distinction might be important. For example, the psychomotor remedy to an automotive trouble-shooting experience could be exactly the same for two groups of students, while the related cognitive behavior could be quite different. One group's cognitive behavior might be classified as C2.1, i.e. Knowledge Application Without Alteration, while the second group might arrive at the same psychomotor conclusion, as it were, from an analysis of first principles, or C2.2, i.e. Knowledge Application With Alteration. After knowledge has been altered and a solution found and stored, the next time the same problem is encountered it is likely that the related cognitive behavior would be C2.1.

Psychomotor capabilities sought be instructional programs can be distinguished by the related cognitive behavior and this differentiation might describe important aspects of both the student and the training program that would otherwise go unnoticed. To associate a psychomotor capability with its related cognitive competency, the instructor will use the simple check boxes at the top of the reverse side of Form #9.

First: Check the Psychomotor box only if the performance of the Objective has significant muscular activity. Pencil and paper activities are generally not psychomotor (calculate, identify, list, describe, etc.)

Second: Check only one of the four Cognitive Capability boxes. Determine whether the capability is Knowledge Acquisition or Knowledge Application and check the one capability in that section which best describes the mental activity involved.

III. Affective Capabilities

Affective capabilities are defined as positive or negative feelings toward an object, person, or idea. Positive or negative feelings can be described as a point on a continuum, from extremely positive to extremely negative. The purpose of the classification system is to differentiate parts of the continuum such that common understandings can be obtained in communicating the amount of positive or negative affect toward an object, person, or idea. An affective capability could be conceived as a value, with the classification system describing the extent of adoption.

Affective capabilities are invisible and must be inferred from behavior. Behavioral objectives describe specific behaviors from which affective capabilities can be inferred. Cognitive and psychomotor capabilities are inferred from what a person is capable of doing or can do, while affective capabilities are inferred from behavioral objectives that describe what a person will do.

Affective Classification System:*

A1.0 Receiving Capability - A receiving capability describes perception of an object, person, or idea, and is a precondition

*Modified from Krathwohl, David R., Taxonomy of Educational Objectives, Handbook II: Affective Domain, David McKay Company, Inc., New York, 1964.

to the adoption of a positive or negative feeling toward a particular object, person or idea. A receiving capability is defined very much like a knowledge capability. The emphasis is not the ability to recall but that the individual wills to be conscious of an object, person, or idea. Behavioral Objectives from which a receiving capability can be inferred would describe a person willing to perceive an object, person, or idea. A receiving capability would be defined as a willingness to be aware of or perceive an object, idea, or person. If the affective object were shop safety, a typical behavioral objective from which a receiving capability could be inferred might be that the person had willed to obtain knowledge of shop safety.

Receiving capabilities are defined as including some positive or negative feeling component such that perception is willed. (See Affective Continuum, page 57.)

A2.0 Responding Capability (beginning to commit) - At this band in the continuum the attention to an object, person, or idea is willed. The behavior from which this capability can be inferred describes a person doing something about an object, person, or idea beyond merely being aware of it. Two distinct categories are stipulated within this subdivision, and Acquiescence Capability and a Willingness Capability.

A2.1 Acquiescence Capability - Compliance or obedience behaviors to an object, person, or idea are those which infer this af

fective capability, i.e. a person's behavior is a function of something other than a commitment. Educators at all levels should have little difficulty in recognizing behavior which infers this capability by conceiving of it as "psyching out" behavior. An example of a behavioral objective might be that an individual complies with shop safety rules. The feeling component of this part of the continuum is such that compliance is not psychologically uncomfortable, i.e. it is at least positive or negative enough not to cause dissonance with conformity.

A2.2 Willingness Capability - Willingness, which implies voluntary behavior, is the fundamental characteristic of this part on the affective continuum. The affective capability is described as the existence of enough feeling that a person wills, without outside interference, to behave in a way consistent with a positive or negative feeling toward an object, idea, or person. He is much more committed than when he is only willing to perceive the object, person, or idea, and somewhat more committed than when he involuntarily complies. A behavioral objective from which this capability can be inferred might describe a student seeking knowledge about safety procedures in a shop setting.

A3.0 Valuing Capability (Full Commitment) - At these ends of the affective continuum the affective capability involves consistent commitment to a positive or negative feeling toward an object, person, or idea. Two categories are stipulated: Acceptance

and Full Commitment.

A3.1 Acceptance Capability - The affective capability at these bands of the continuum results from the internalization of sufficient positive or negative feeling toward an object, idea, or person that an individual wills to be publically identified with his feeling. A second distinguishing feature of this capability is consistency of feeling, reflected in behavior. Behavioral objectives from which this capability could be inferred might be a willingness to play a leadership role to improve shop safety.

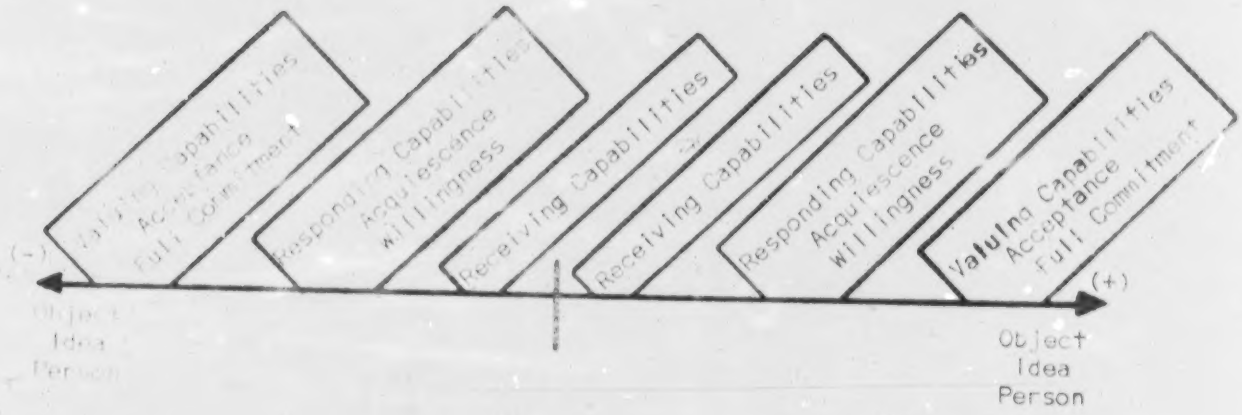
A3.2 Full Commitment Capability - The affective capability at these outside ends of the affective continuum can be described as complete emotional commitment to a positive or negative feeling toward an object, person, or idea. The affective capability at these ends of the continuum is such that the individual wills to convince and/or convert others to his "cause". A behavioral objective from which the affective capability might be inferred could be that an individual wills to convince all participants of the necessity of establishing and maintaining shop safety rules and regulations.

A4.0 Values Organization Capability - Up to this point we have been describing an affective capability continuum which provides for the internalization of a single value toward an object, person, or idea. Values Organization Capability does not fit anywhere on the continuum, but is a separate phenomenon; the organization of a value system. This capability describes a

person willing to interrelate a complex of values into a value system. This is an extremely complex psychological process, and the purpose of this category is not to distinguish among various strategies of value system organization, but, simply to provide a classification category for this distinct affective capability. An objective from which this capability might be inferred would be that a saw mill foreman, for example, will be able to reconcile an extremely strong feeling (A3.1) toward shop safety with an equally weighted feeling toward productivity.

Note: A checklist classification table for affective capabilities will be offered in a supplemental publication.

AFFECTIVE CAPABILITY CONTINUUM



Relationship between Affective and Other Capabilities

No provisions are made in the Capability Classification System for relating affective capabilities with specific cognitive or psychomotor capabilities sought by instructional programs, although such a development would be straightforward. The reason is that it is anticipated affective capabilities will span cognitive and psychomotor capabilities both within and among educational programs. For example, it seems that educational institutions are typically more concerned with fostering positive feelings toward relatively global concepts such as self as a competent worker and work as a desirable activity, rather than with the particular affective components of a specific cognitive or psychomotor capability.

A Summary of the Capability Classification System

The following is offered not only as a summary, but a statement of the simplicity of the Capability Classification System offered in this paper. Cognitive and/or Psychomotor Capabilities are to be classified as follows (adopted from Form #9):

CAPABILITY CLASSIFICATION

Psychomotor

[ ] Psychomotor (Check only if performance requires a significant amount of muscular activity).

Cognitive

(Check the one cognitive capability that best describes the mental activity involved).

Knowledge Acquisition

[ ] C1.1 Knowledge of specifics

[ ] C1.2 Knowledge of Ways & Means of Dealing with Specifics

Knowledge Application

[ ] C2.1 Knowledge Application Without Alteration

[ ] C2.2 Knowledge Application With Alteration

Conclusion

The fundamental purpose of the Capability Classification System is to provide an analytical tool to render the product of the Evaluation Service Center more useful for the purpose of program modification in a manner consistent with the philosophical principle on which the Center was established. Without such a classification system, the program modification potential offered by the Center would be extremely gross. The Capability Classification System allows institutions to deal with specific elements of programs and provides feedback on the specific capabilities these elements are designed to develop. The usefulness of the Capability Classification System will become evident when schools begin to analyze their programs in comparison with other schools offering similar objectives.

SECTION 9B

RELATED DISCIPLINE

It is suggested that it can be of enormous usefulness to participating IFA's to be able to determine the similarity of related subject disciplines among occupational education programs. For example, if objectives are coded by Natural Science discipline, it is possible to determine the common mathematics capabilities sought by all occupational programs within or across institutions. This can be of immediate usefulness to curriculum planners.

The classifications for the Natural Science disciplines are those established by the National Center for Educational Statistics, U.S. Office of Education.*

A checklist of related disciplines is provided on the reverse side of the Behavioral Objective Reporting Form No. 9, and should be completed as part of the objective reporting process. Actual code numbers will be entered by the Evaluation Service Center as a function of the editing process.

*Standard Terminology for Instruction in Local and State School Systems, State Educational Records and Reports Series: Handbook VI, (Preliminary Ed.), U.S. Department of Health, Education, and Welfare, Office of Education.

SECTION 10

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